

Ferry Street Railroad Bridge
Ferry Street over New Haven Railroad
New Haven
New Haven County
Connecticut

HAER No. CT-54

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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

HISTORIC AMERICAN ENGINEERING RECORD

FERRY STREET RAILROAD BRIDGE

HAER No. CT-54

Location: Ferry Street over New Haven Railroad
New Haven
New Haven County, Connecticut

UTM: 18.675860.4576080
Quad: New Haven, Connecticut, 1:24000

Date of Construction: 1912

Engineer: New York, New Haven & Hartford Railroad
Fabricator: Boston Bridge Works, Inc.

Present Owner: State of Connecticut
Department of Transportation
24 Wolcott Hill Road
Wethersfield, Connecticut 06109

Present Use: Vehicular bridge

Significance: Ferry Street Railroad Bridge is significant as a representative example of standard 20th-century truss construction; as a product of Boston Bridge Works, a regionally important bridge fabricator; and as part of the New Haven Railroad's extensive improvements to its freight facilities.

Project Information: This documentation was undertaken in February 1991 at the request of the Connecticut State Historic Preservation Officer in a review of a project by the Connecticut Department of Transportation to repair the roadway and bridge, including selective replacement-in-kind of deteriorated truss members. Because of the use of federal funds, the Federal Highway Administration requested the comments of the Advisory Council on Historic Preservation; the Advisory Council concurred in a finding of No Adverse Effect conditional upon documentation.

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Description of Bridge and Setting

The Ferry Street bridge across the railroad right-of-way in New Haven, Connecticut is a 114'-long steel double-intersection Warren through truss built in 1912. Currently divided into two traffic lanes, the roadway width is 38' between curbs; the bridge's width across the truss centers is 42' 8". Vertical clearance at the portals is 18' 10". Plate-girder outriggers support sidewalks along both sides of the bridge.

The railroad right-of-way is five tracks wide and runs in a cut below the level of the surrounding neighborhood, which is a densely built commercial and residential area of low-rise frame buildings. The bridge offers about 25' of clearance above the tracks. The right-of-way was owned by the New York, New Haven & Hartford Railroad, commonly called the New Haven Railroad, until that company's final demise in the 1960s. Presently, the two southernmost tracks are part of the Boston-New York corridor owned and operated by the National Railroad Passenger Corporation (AMTRAK); these tracks also accommodate freight service provided by the Consolidated Rail Corporation (CONRAIL) and passenger commuter service operated by the Connecticut Department of Transportation. The other tracks serve the freight yards owned and operated by CONRAIL; the New Haven-Middletown CONRAIL freight line; and the New Haven-Hartford line owned by the Connecticut Department of Transportation, over which AMTRAK operates its passenger service and CONRAIL its freight service.

The bridge's Warren truss pattern features hip verticals and sub-verticals from each intersection of diagonals and from the inclined end posts, making a total of ten panels. The bridge exhibits a pronounced camber along its length. The truss is made up of the following members:

Upper chord and inclined end posts: box girder, 16 x 21", formed from channels, cover plate, and lacing.

Lower chord: box girder, 16 x 16", formed from channels, bottom lacing, and added top plate (see below).

Diagonals: end diagonals are two angles with lacing; others are formed from four angles with laced webs, with the stem of the joined angles' "T" turned outward; diagonals are of two sizes, using 4 x 3 and 5 x 3 1/2" angles.

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Verticals: lattice girders, with the hip verticals formed with 5 x 5 1/2" angles and the sub-verticals with 5 x 3 1/2" angles.

Portal strut: c. 9'-wide lattice of angles, with curved plate sway braces.

Top bracing: lattice-girder struts, c. 3' deep; full diagonal lateral bracing, c. 16" deep, formed from laced angles; and lattice-girder longitudinal bracing down the center of the bridge.

All connections are riveted, using large gusset plates.

The floor system consists of heavy plate-girder floor beams and fifteen rolled I-beam stringers. The floor beams are suspended below the level of the cambered lower chord and are graduated in depth from 24" at the ends to 36" in the center of the bridge, creating a level line of underclearance. The stringers are 12" deep, except four near the center of the bridge which are 15" deep and are mounted at a lower level. These formerly accommodated the roadbed for two streetcar tracks. The stringers in between the larger ones do not appear on the original plans; they may have been added as part of repair work undertaken in 1933. The bridge's deck was originally two layers of wood planks. The wooden deck in place in 1959 was replaced at that time with the present concrete-filled steel I-beam deck supported on transverse beams laid across the original stringers.

The roadway is protected on one side only by a metal guardrail attached to the south truss. Solid board fences serve as sidewalk railings.

On the southwest end post is a fragment of a builder's plate reading "WORKS INC/1927". At the time of the Connecticut Inventory of Historic Engineering and Industrial Sites (Roth, 1981) the plate was intact, reading "BOSTON BRIDGE/WORKS INC/1927".

The bridge rests on pinned shoes, with one end fixed and the other sliding in roller nests. The abutments are of two types. The east end rests on a standard concrete abutment, but the west end is supported on a three-column concrete trestle constructed against an older masonry abutment.

There are a number of utility lines carried by the bridge: a 12" gas pipe along the south sidewalk, a 10" water pipe along the roadway side of the north truss, and a series of four small

gas pipes along the north sidewalk. A short distance north of the bridge, a small steel truss carries a sewer pipe over the tracks.

The bridge is relatively unchanged from its original appearance. In addition to the new deck noted above, the 1959 repair work added a steel plate to the top of the lower chord, replacing a wooden cover plate (the lower chord formerly carried high-voltage electrical cables), and the sidewalk decks were replaced.

Historical Context

Ferry Street Railroad Bridge was built at a time of tremendous expansion by the New York, New Haven, & Hartford Railroad. Formed in 1872 as a consolidation of two smaller companies with their origins in the 1830s, the New Haven Railroad controlled most of the trackage in Connecticut. In the last quarter of the 19th century, the New Haven bought, leased, or merged with nearly every other railroad in southern New England. Its routes included not only the original New Haven-Hartford line but also the so-called "Air Line," from Boston to New York through Middletown, and the Boston-New York "Shore Line" (the present Northeast Corridor). All these lines came together at New Haven and passed under this bridge.

Since New England was one of the most industrialized areas in the country and one of the most densely populated, the New Haven benefited from high levels of both freight and passenger traffic, and it became one of the largest carriers in the United States. It was estimated that nearly one of every ten passengers in the country was carried by the New Haven Railroad. In the 1890s and early 1900s, the railroad completely rebuilt its major lines, doubling its track width to four tracks west of New Haven and two tracks on its routes north and east of the city. In 1914 the innovative electrification of the railroad was completed from New Haven to New York.

Between 1910 and 1913, the railroad built a large new classification yard in the northeast part of New Haven, the Cedar Hill Terminal, in order to consolidate and expand its freight operations. In connection with that work, the railroad right-of-way was then further widened to accommodate more tracks, and electrification was extended to the new Cedar Hill Yard.

The widening required a new bridge at Ferry Street. Ferry

Street, which turns south after crossing the bridge, is a major artery through the east side or Fair Haven section of New Haven, continuing across the Quinnipiac River to the East Fair Haven neighborhood. At the time the bridge was built, it carried a double-tracked streetcar line down the center, as indicated by the larger stringers. The bridge was entirely paid for by the railroad with the exception of \$316.92 paid by the city of New Haven for a temporary bridge during construction.

Technological Significance

In its design, material, and method of connection, Ferry Street Railroad Bridge typifies the standard bridge engineering which had evolved by the early 20th century. The bridge uses the Warren configuration which, along with the Pratt truss, had become almost universal, replacing the myriad of patented trusses that had characterized the 19th century. Similarly, its material, steel, had superseded wrought iron, and the use of riveted connections had replaced the pinned method in all but the largest of trusses.

The bridge is unusually rugged for a highway bridge of this size and period, even for one carrying streetcar traffic. The large size of the members, the use of subverticals to divide the panels, and the double-web system all derive from its origin in a railroad engineering department. Railroads were accustomed to designing for much higher loads than highway engineers, and they favored multiple-web designs because of their greater rigidity. Rigidity was important in railroad bridges because a relatively slight deflection could result in derailment.

This bridge was over-designed not simply from habit but also because of the absolute need to protect the right-of-way from accidents. Because three major passenger lines came together at this point, and virtually every freight car to and from New England passed under the bridge, any accident would shut down nearly the entire railroad.

The Bridge's Fabricator

Boston Bridge Works was a prominent bridge manufacturer, at one time dominating the New England market for large railroad and highway trusses. The firm was founded in 1876 by D.H. Andrews, formerly an engineer with another Boston fabricator, National Bridge and Iron Works. For the next 55 years, the

company had a thriving business building bridges, steel-framed buildings, and large specialized structures such as dock cranes and railroad turntables. The company fell on hard times in the Depression, finally going out of business in 1938. Among notable surviving Boston Bridge Works structures are the 1885 Albion Bridge, Cumberland, Rhode Island; the 1892 Harvard Bridge in Boston; the 1905 Connecticut River railroad bridge, Woodsville, New Hampshire; and the 1926 Point Street Swing Bridge, Providence, Rhode Island. Only one other highway bridge by the firm is known to exist in Connecticut, and it is scheduled for demolition.

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